

Unit 5  
Day 8  
Review Class

We will approach these problems as if you have 3 minutes to finish each problem. I will give you 1 minute to strategize and then we will finish it together.

1)

$$x^7 - 64x$$

$$x(x^6 - 64)$$

$$x(x^3 + 8)(x^3 - 8)$$

$$x(x+2)(x^2-2x+4)(x-2)(x^2+2x+4)$$


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$$x(x^6 - 64) = x(x^2 - 4)(x^4 + 4x^2 + 16)$$

$$= x(x+2)(x-2)(x^4 + 4x^2 + 16)$$

$$= x(x+2)(x-2)(x^4 + 8x^2 + 16 - 4x^2)$$

$$= x(x+2)(x-2)[(x^2 + 4)^2 - 4x^2]$$

$$= x(x+2)(x-2)(x^2 + 4 - 2x)(x^2 + 4 + 2x)$$

$$\frac{x^2 + 2x + 4}{x^2 + 4x + 4} \cdot 2x = (x+2)^2 - 2x$$

2)

$$x^4 + 2x^2 + 9$$

$$(x^4 + 6x^2 + 9) - 4x^2$$

$$(x^2 + 3)^2 - 4x^2$$

$$(x^2 + 3 - 2x)(x^2 + 3 + 2x)$$

$$(x^2 - 2x + 3)(x^2 + 2x + 3)$$

$$3) (2ax + 3a) + (2bx + 3b) + (2cx + 3c)$$

$$a(2x+3) + b(2x+3) + c(2x+3)$$

$$(2x+3)(a+b+c)$$

$$ax + bx + cx$$

$$= \cancel{x^3(a+b+c)}$$

4)

$$4x^2 - 25a^2 + 4xy + y^2 + 10ab - b^2$$

$$(4x^2 + 4xy + y^2) + (25a^2 + 10ab - b^2)$$

$$(4x^2 + 4xy + y^2) - (25a^2 - 10ab + b^2)$$

$$(2x + y)^2 - (5a - b)^2$$

~~Keep going~~

$$(2x + y + 5a - b)(2x + y - 5a + b)$$

Factor over real and complex.

5)

$$5x^3 - 12x$$

$$x(5x^2 - 12)$$

$$x(x\sqrt{5} + \sqrt{12})(x\sqrt{5} - \sqrt{12})$$

$$x(x\sqrt{5} + 2\sqrt{3})(x\sqrt{5} - 2\sqrt{3})$$

Factor over real and complex.

6)

$$x^4 - 25$$

$$(x^2 - 5)(x^2 + 5)$$

$$(x - \sqrt{5})(x + \sqrt{5})(x - i\sqrt{5})(x + i\sqrt{5})$$